

LISTS OF SPECIES

Fish, Cubatão River basin, Atlantic Rainforest stream, Paraná, Brazil

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Abstract

The freshwater ichthyofauna of the Cubatão River basin was studied. This drainage belongs to the Atlantic rainforest biome in Paraná state coastal region, southern Brazil. Considering fish collection data and extensive new collections, 41 species were listed of the families Characidae, Erythrinidae, Crenuchidae, Curimatidae, Heptapteridae, Pseudopimelodidae, Callichthyidae, Trichomycteridae, Loricariidae, Gymnotidae, Cichlidae, Anablepidae, Poeciliidae, and Synbranchidae. The river studied showed the ichthyofaunistic pattern of the coastal drainages of the Atlantic rainforest biome of southeastern Brazil, characterized by a high degree of endemism. A key for species identification is provided.

Introduction

The coastal drainages in the Atlantic rainforest biome of southeastern Brazil present a rich and diversified freshwater ichthyofauna, with a high rate of speciation and a high degree of endemism (Bizerril 1994; Castro 1999; Ribeiro 2006). Such facts are probably related to concentration of a high number of isolated river basins by a series of mountain ranges forming valleys in this region. These topographic and physiognomic characteristics allow the formation of a great number of environments, which allow the occurrence of a great number of species, each one adapted to a particular habitat (Menezes 1996).

The Cubatão River basin belongs to the Atlantic rainforest dominium, and it is located in an ichthyofaunistic region which comprises coastal streams and rivers between southern Rio de Janeiro and northern Santa Catarina states (Menezes 1988; Weitzman et al. 1988). Because of the lack of information about freshwater fish from coastal rivers of state of Paraná, this study aims to provide a list of species of the Cubatão River basin, giving basic information support to projects related to fish biology and conservation.

Material and methods

The Cubatão River basin headwaters are located nearby Guaricana Reservoir (aprox. 25°40' S, 48°40' W), in São José dos Pinhais municipality, in the first plateau of state of Paraná, and flows

into the Guaratuba bay, in the southern region of the Atlantic coast of Paraná (Maack 2002). Its most important tributaries are Arraial, Cubatãozinho, and São João rivers (Figure 1).

The list of species is based on the examination of more than 500 lots of fishes belonging to the *Museu de História Natural Capão da Imbuia* (MHNCI), along with material collected in nine field expeditions made between February and October 2004 in the *Reflorestadora Banestado* in Guaratuba municipality (aprox. 25°49' S, 48°47' W).

The specimens were collected with gill nets (2; 2.5; 3; 3.5; 4 and 5 cm stretched mesh), fishing rod and pot gears. Captured specimens were fixed in the field in 10% formalin solution and brought to the laboratories of the MHNCI. Fish were collected with IBAMA authorization 96/2004 (process 02017.003718/2003-55).

Species identification followed Géry (1977), Menezes (1987), Burgess (1989), Buckup & Reis (1997), Schaefer (1997), Buckup *et al.* (2007), and Lucinda (2008). The taxonomic organization of the registered species was defined according to Reis et al. (2003). The criterion employed to the use of “aff.” e “cf.” terms follows Malabarba (1989) and Shibata et al. (2002).

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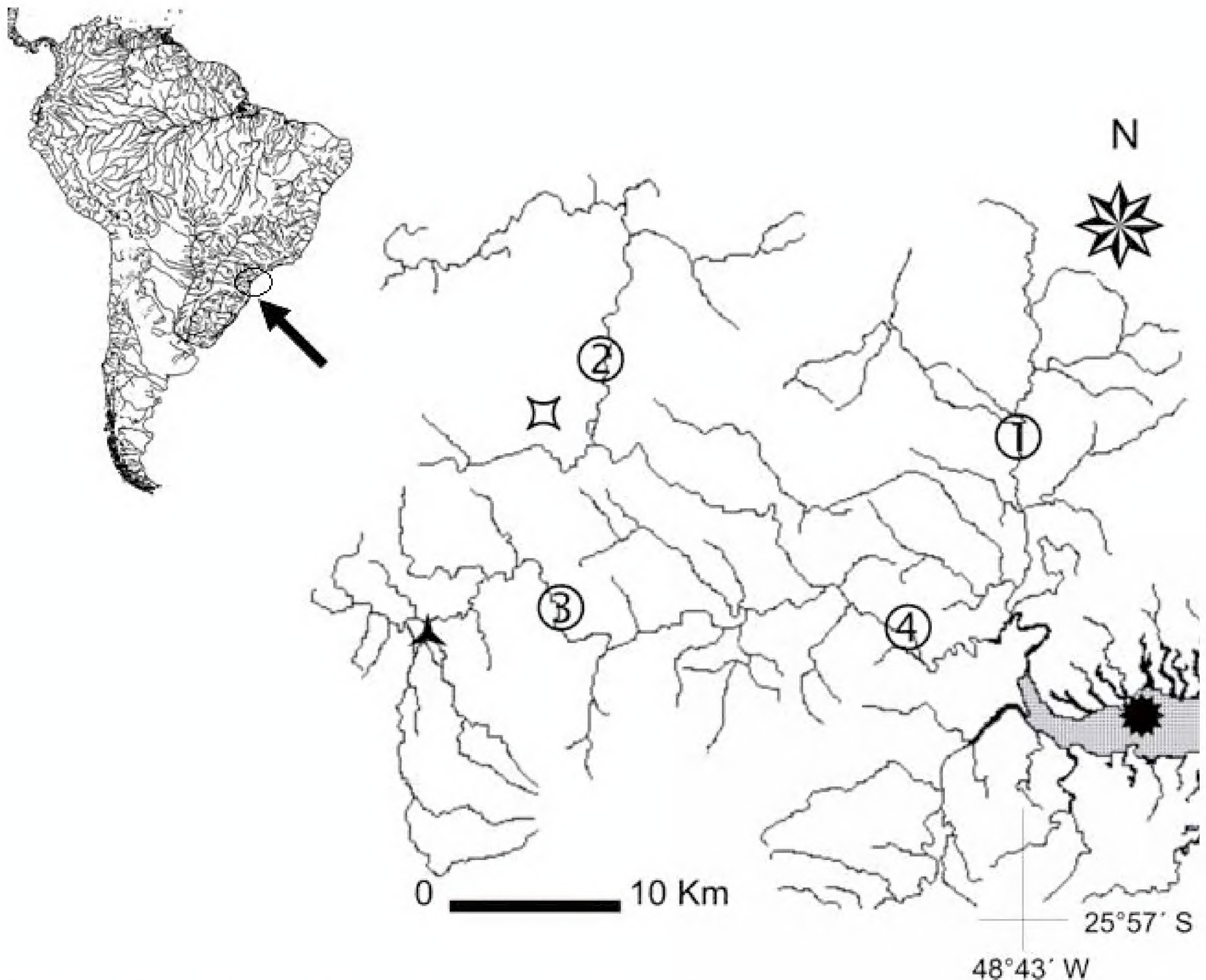


Figure 1. Cubatão River basin area in the southern region of coast of state of Paraná. Cubatãozinho River ①, Arraial River ②, São João River ③, Cubatão River ④, Guaratuba bay ★, Guaricana Reservoir ◻, and Vossoroca Reservoir ▲.

In the “Material examined” list species are listed by alphabetic order within each taxonomic category. Species data include catalog number, number of specimens, collection site, date and collectors.

Results and discussion

Forty one freshwater fish species were recorded in the Cubatão River basin, belonging to 14 families and six orders (Table 1). The most species-rich families were Loricariidae, with 12 species (29.3 %) and Characidae, with seven species (17.1 %). The predominance of the orders Siluriformes (53.6 %) and Characiformes

(29.3 %) agrees with the expected freshwater fish composition for Neotropical region (Lowe-McConnell, 1987).

Six species registered are probably new (*Astyanax* sp., *Characidium* sp., *Schizolecis* sp., *Rineloricaria* sp. 1, *Rineloricaria* sp. 2, and *Jenynsia* sp.) and two species (*Corydoras ehrhardti* e *C. paleatus*) were registered for the first time for the coastal Atlantic rainforest river basins in state of Paraná. Four examined species belongs to taxa with broad geographical distributions (*Astyanax* aff. *scabripinnis*, *Hoplias* aff. *malabaricus*, *Trichomycterus* cf. *zonatus*, and



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Hypostomus cf. *punctatus*), which probably will be split into other species when taxonomically revised.

The noteworthy abundance of the order Siluriformes (22 species) may be correlated with habitat characteristics, specifically with the predominance of riffle areas in the upper stretches and submerged marginal vegetation in the lower stretches. The Cubatão River basin also presents a great variety of predominant substrates, with sandy, rocky, and gravelly types according to the portions of the riffles areas.

Species belonging to groups taxonomically poorly known, such as *Astyanax*, *Characidium*, *Hypostomus*, and *Rineloricaria* could be endemic for the region. There is considerable evidence that the coastal drainages in the Atlantic Rainforest Biome from eastern Brazil between southern Rio

de Janeiro and northern Santa Catarina states present a rich and diversified freshwater ichthyofauna, with a high number of endemic species (Weitzman et al. 1988; Bizerril 1994; Ribeiro 2006). These drainages are inhabited basically by small-sized fish species, which dwell in streams or shallow water of rivers, showing sometimes a high rate of speciation and a high degree of geographic endemism (Castro 1999).

The aquatic habitats from Atlantic rainforest are threatened by anthropogenic activities, such as deforestation and the extensive land use for agriculture and urban area development. Considering that the forest cover is very important for foraging activities of mostly small-sized Atlantic rainforest fish, such as several species registered herein, the Cubatão River basin deserve better attention in the planning of new protected areas.

Table 1. List of freshwater fish species registered in Cubatão river basin, state of Paraná.

CHARACIFORMES

Characidae

- Astyanax* aff. *scabripinnis* (Jenyns, 1842)
- Astyanax* sp.
- Bryconamericus microcephalus* (Miranda-Ribeiro, 1908)
- Deuterodon langei* Travassos, 1957
- Hyphessobrycon luetkenii* (Boulenger, 1887)
- Oligosarcus hepsetus* (Cuvier, 1829)
- Mimagoniates microlepis* Steindachner, 1877

Crenuchidae

- Characidium* sp.
- Characidium lanei* Travassos, 1967
- Characidium pterostictum* Gomes, 1947

Curimatidae

- Cyphocharax santacatarinae* (Fernández-Yépez, 1948)

Erythrinidae

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Hoplias aff. *malabaricus* (Bloch, 1794)

SILURIFORMES

Heptapteridae

Acentronichthys leptos Eigenmann & Eigenmann, 1889

Pimelodella pappenheimi Ahl, 1925

Rhamdia quelen (Quoy & Gaimard, 1824)

Rhamdioglanis frenatus Ihering, 1907

Pseudopimelodidae

Microglanis cibela Malabarba & Mahler-Jr, 1998

Loricariidae

Ancistrus multispinnis (Regan, 1912)

Pareiorhaphis azygolechis (Pereira & Reis, 2002)

Pareiorhaphis splendens (Bizerril, 1995)

Pareiorhaphis steindachneri (Miranda-Ribeiro, 1918)

Hypostomus cf. *punctatus* Valenciennes, 1840

Kronichthys lacerta (Nichols, 1919)

Hisonotus leucofrenatus (Miranda-Ribeiro, 1908)

Pseudotothyris obtusa (Miranda-Ribeiro, 1911)

Rineloricaria sp. 1

Rineloricaria sp. 2

Schizolecis guntheri (Miranda-Ribeiro, 1918)

Schizolecis sp.

Callichthyidae

Callichthys callichthys (Linnaeus, 1758)

Corydoras ehrhardti Steindachner, 1910

Corydoras paleatus (Jenyns, 1842)

Scleromystax barbatus (Quoy & Gaimard, 1824)

Trichomycteridae

Trichomycterus cf. *zonatus* (Eigenmann, 1918)

GYMNOTIFORMES

Gymnotidae

Gymnotus aff. *carapo* Linnaeus, 1758

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PERCIFORMES

Cichlidae

- Crenicichla tingui* Kullander & Lucena, 2006
- Geophagus brasiliensis* (Quoy & Gaimard, 1824)
- Tilapia rendalli* (Boulenger, 1897)

CYPRINODONTIFORMES

Poeciliidae

- Phalloceros megapolos* Lucinda, 2008

Anablepidae

- Jenynsia* sp.

SYNBRANCHIFORMES

Synbranchidae

- Synbranchus marmoratus* Bloch, 1795

Species identification key

- 1 Body covered with scales 2
- 1' Body naked or covered with bony plates 19
- 2 Anal fin long (150 rays or more); tail cylindrical and pointed, extending beyond the anal fin; series of dark bars on the flanks..... *Gymnotus* aff. *carapo*
- 2' Less than 35 anal-fin rays 3
- 3 Premaxillary protractile 4
- 3' Premaxillary not protractile 8
- 4 Small sized fish of less than 4 cm in total length; dorsal fin short, without spines; males with anal fin modified as a gonopodium 5
- 4' Dorsal and anal fins with spines; lateral line interrupted 6
- 5 Gonopodium short, tubular; a single midlateral stripe, with dorso and ventrolateral small blotches *Jenynsia* sp.
- 5' Gonopodium long; a vertically elongated black spot on median region of flank *Phalloceros megapolos*
- 6 Body slender; body depth contained four times or more in standard length; adults with posterior margin of preopercle serrated *Crenicichla tingui*
- 6' Body depth contained three times or less in standard length 7

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- 7 First branchial arch with a lobule; a black spot on the midline below the dorsal fin
Geophagus brasiliensis
- 7' First branchial arch without a lobule; dorsal fin with 15 spines and 14 rays; a dark spot at the base of dorsal-fin rays *Tilapia rendalli*
- 8 Maxilla without teeth *Cyphocharax santacatarinae*
- 8' Maxilla with teeth 9
- 9 Caudal fin rounded at the edge *Hoplias aff. malabaricus*
- 9' Caudal fin forked 10
- 10 Lateral line complete 11
- 10' Lateral line incomplete; no scale sheath along anal-fin base; males with modified scales on the base of the caudal-fin *Mimagoniates microlepis*
- 11 Anal fin with 10 rays or less 12
- 11' Anal fin with 15 rays or more 14
- 12 Lateral line with 35 scales or more; caudal and dorsal fin hyaline; a dark stripe extending along midlateral body, with a series of small spots below and above the stripe; maxilla elongate, surpassing the anterior orbit margin; orbit diameter 25 % or less in head length *Characidium* sp.
- 12' A dark stripe extending along midlateral body, with dark middorsal blotches sometimes extending as narrow vertical bars on side of body; dorsal and caudal fin with patches of small, brown dots, irregularly distributed; lateral line with 33 to 35 scales; maxilla moderately elongate, reaching vertical line trough anterior border of eye 13
- 13 Mouth terminal; dorsal and caudal fin dots nearly absent; interorbital width 15 % or less in head length; head length 25 % or more in standard length *Characidium lanei*
- 13' Mouth terminal, slightly inferior; caudal fin irregularly blotched; narrow vertical bars on the side of body; interorbital width 17% or more in head length; head length 25 % or less in standard length *Characidium pterostictum*
- 14 Snout long; mouth with caniniform teeth; lateral line with 60 to 75 scales *Oligosarcus hepsetus*
- 14' Mouth with multicuspidated teeth; two tooth rows on premaxilla, lateral line with 45 or less scales 15
- 15 Inner row of premaxilla with four teeth 16
- 15' Inner row of premaxilla with five teeth 17
- 16 Mouth subterminal to inferior, upper jaw gently curved; lateral line with 37 to 39 scales *Bryconamericus microcephalus*
- 16' Mouth terminal; lateral line with 33 to 35 scales; caudal peduncle spot extending along middle caudal-fin rays *Hyphessobrycon luetkenii*

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- 17 Dentary teeth gradually decreasing in size from first to last tooth; maxillary teeth visible when mouth is closed; inner premaxillary teeth multicuspidated and distally expanded; lateral line with 37 to 39 scales; caudal fin with 17 to 20 branched rays
Deuterodon langei
- 17' Three to five anteriormost dentary teeth larger, followed by one or two medium-sized teeth; inner premaxillary teeth multicuspidated, central cusp in all teeth longer and broader than other cusps 18
- 18 Black humeral spot well-defined and round, with vertically elongated line extended anteroventrally; lateral line with 34 to 39 scales; anal fin with 16 to 19 branched rays *Astyanax* aff. *scabripinnis*
- 18' Black humeral spot vertically elongated; lateral line with 40 to 43 scales; anal fin with 18 to 22 branched rays *Astyanax* sp.
- 19 Body naked 20
- 19' Body covered with bony plates 26
- 20 Barbells absent; a single ventral opercular opening; body cylindrical and long
Synbranchus marmoratus
- 20' Barbells present; two opercular opening 21
- 21 Opercle and interopercle with patches of odontodes, nasal barbels present
Trichomycterus cf. *zonatus*
- 21' Opercle area without odontodes 22
- 22 Dorsal and pectoral fins with spine 23
- 22' First dorsal and pectoral-fin ray flexible 25
- 23 Eye covered by thin skin *Microglanis cibela*
- 23' Orbital margin free 24
- 24 Occipital process not reaching pre-dorsal plate *Rhamdia quelen*
- 24' Occipital process reaching pre-dorsal plate; a narrow dark stripe extending along mid-lateral body *Pimelodella pappenheimi*
- 25 Anal fin long (16 rays or more) *Acentronichthys leptos*
- 25' Anal fin short (15 rays or less) *Rhamdioglanis frenatus*
- 26 Two longitudinal series of body plates; mouth terminal, slightly inferior 27
- 26' Three or more longitudinal series of body plates; mouth ventral and sucker-like 30
- 27 Caudal fin with rounded edge; head depressed; eyes located dorso-laterally on head; barbells reaching pectoral-fin base *Callichthys callichthys*
- 27' Caudal fin forked; head profile convex; eyes positioned laterally on head; short barbells 28
- 28 25 dorso-lateral body plates; distance between snout tip and anterior margin of the orbit 50% or more in head length *Scleromystax barbatus*

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- 28' Less than 25 dorso-lateral body plates; distance between snout tip and anterior margin of the orbit 50% or less in head length 29
- 29 Trunk light brown to yellow colored, with several dark dots scattered over entire surface of trunk; fins irregularly blotched *Corydoras paleatus*
- 29' Trunk light brown to yellow colored, with two conspicuous dark dots; fins hyaline or slightly blotched..... *Corydoras ehrhardti*
- 30 Ventral surface of the pectoral girdle covered in skin or plates 31
- 30' Ventral surface of the pectoral girdle exposed 38
- 31 Presence of hypertrophied odontodes on cheek plates; fleshy tentacles on the snout of mature males *Ancistrus multispinnis*
- 31' Cheek plates without hypertrophied odontodes, mature males without fleshy tentacles 32
- 32 Caudal peduncle dorso-ventrally flattened, long, with keels on lateral bony plates . 33
- 32' Caudal peduncle oval, round or triangular in cross-section 34
- 33 Three dark-brown bands on dorsal region of body between dorsal and caudal fins; central band sometimes partially divided, caudal-fin first ray not prolonged in a filament *Rineloricaria* sp. 1
- 33' Four dark-brown bands on dorsal region of body between dorsal and caudal fins; caudal-fin first ray filamentous *Rineloricaria* sp. 2
- 34' Abdomen covered by small plates *Hypostomus* cf. *punctatus*
- 34 Abdomen naked 35
- 35 Hypertrophied odontodes along head margin 36
- 35' No hypertrophied odontodes along head margin *Kronichthys lacerta*
- 36 Three to 6 small pre-adipose azygous plates *Pareiorhaphis azygolechis*
- 36' One or 2 small pre-adipose azygous plates 37
- 37 Pelvic-fin spine shorter than thoracic length; lips developed; lower lip reaching pectoral girdle *Pareiorhaphis splendens*
- 37' Pelvic-fin spine longer than thoracic length; lower lip not reaching pectoral girdle *Pareiorhaphis steindachneri*
- 38 Abdomen covered by small plates *Hisonotus leucofrenatus*
- 38' Abdomen naked 39
- 39 Three conspicuous crests on the head; pectoral girdle completely exposed; a fan-shaped brown blotch at the base of caudal fin *Pseudotothyris obtusa*
- 39' Crests inconspicuous on the head; pectoral girdle exposed only laterally; a brown blotch on the caudal-fin base, with a small light area on the middle of the blotch 40

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- 40 Head slightly triangular in dorsal view; mouth width 50 % or less in head length ..
Schizolecis sp.
- 40' Head slightly rounded in dorsal view; mouth width 60 % or more in head length ..
Schizolecis guntheri

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Appendix 1: Voucher specimens.

CHARACIFORMES: *Astyanax* aff. *scabripinnis*: MHNCI 5076 to 5088, 13, Arraial River, 26 Mar 1985, J. C. Ribeiro and A. Dambrós; MHNCI 5114 to 5133, 20, Arraial River, 2 Sep 1985, J. C. Ribeiro and A. Dambrós; MHNCI 8955, 9, Arraial River, 2 Nov 1996, W. Wosiacki and V. Abilhoa. *Astyanax* sp.: MHNCI 5233 to 5235, 3, Arraial River, 23 Oct 1985, A. Carneiro; MHNCI 5145 to 5157, 13, Arraial River, 1 Oct 1985, J. C. Ribeiro and A. Carneiro; MHNCI 5159 to 5168, 10, Arraial, 1 Oct 1985, J. C. Ribeiro and A. Carneiro. *Bryconamericus microcephalus*: MHNCI 6522, 14, Chato stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr.; MHNCI 6787, 2, Chato stream, Cubatãozinho River basin, 1 Oct 1992, A. Barreto and E. Grando Jr. *Characidium* sp.: MHNCI 161, 2, Meio River, Cubatãozinho River basin, Jan 1946, R. Hertel; MHNCI 6540, 3, Grande stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr.; MHNCI 6543, 7, Grande Stream, Cubatãozinho River basin, 22 Mar 1992, E. Grando Jr.; MHNCI 6520, 5, Chato Stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr. *Characidium lanei*: MHNCI 6527, 2, Cubatãozinho River, 21 Mar 1992, E. Grando Jr. *Characidium pterostictum*: MHNCI 8979, 12, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa. *Cyphocarax santacatarinae*: MHNCI 10793, 6, Cubatão River, 12 Jul 2004, F. V. Silva; MHNCI 8974, 2, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa. *Deuterodon langei*: MHNCI 5864 to 5885, 22, Guaricana Reservoir, Arraial River, Jul 1988, W. Wosiacki and M. Cury; MHNCI 5370 to 5372, 3, Guaricana Reservoir, Arraial River, 24 Feb 1986, J. C. Ribeiro and A. Carneiro; MHNCI 8141, 12, Vossoroca Reservoir, 18 Nov 1990, A.M. Cordeiro; MHNCI 8435, 42, Vossoroca Reservoir, 19 Sep 1989, R.G. Hickson and E. Vital; MHNCI 10797, 6, Cubatão River, 21 Apr 2004, F. V. Silva; MHNCI 10917, 14, Vossoroca Reservoir, 20 Nov 1991, IAP-SEMA. *Hoplias malabaricus*: MHNCI 8953, 1, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 9016, 1, Guaricana Reservoir, Arraial River, 10 Jul 1988, W. Wosiacki. *Hyphessobrycon luetkenii*: MHNCI 6770, 1, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr. *Mimagoniates microlepis*: MHNCI 6530, 1, Cubatãozinho River, 21 Mar 1992, E. Grando Jr.; MHNCI 6773, 3, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6777, 21, Stream, Cubatãozinho River basin, 1 Oct 1992, A. Barreto and E. Grando Jr. *Oligosarcus hepsetus*: MHNCI 8434, 2, Vossoroca Reservoir, 19 Sep 1989, R.G. Hickson and E. Vital; MHNCI 10796, 2, Cubatão River, 21 Apr 2004, F. V. Silva.

SILURIFORMES: *Acentronichthys leptos*: MHNCI 6531, 1, Cubatãozinho River, 21 Mar 1992, E. Grando Jr.; MHNCI 6768, 1, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr. *Ancistrus multispinnis*: MHNCI 6756, 3, Cubatãozinho River, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 8972, 1, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa; MHNCI 10790, 2, Cubatão River, 12 Jul 2004, F. V. Silva. *Callichthys callichthys*: MHNCI 6524, 2, swamps, road to Limeira, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr. *Corydoras paleatus*: MHNCI 10919, 4, Vossoroca Reservoir, 20 Nov 1991, IAP-SEMA. *Corydoras ehrhardti*: MHNCI 8977, 2, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa; MHNCI 8968, 4, Castelhanos River, 1 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 10918, 29, Vossoroca Reservoir, 20 Nov 1991, IAP-SEMA. *Hypostomus* cf. *punctatus*: MHNCI 7969, 1, Vossoroca Reservoir, 19 Sep 1989, R.G. Hickson and E. Vital; MHNCI 10786, 2, Cubatão River, 28 Mar 2004, F. V. Silva; MHNCI 8973, 14, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa. *Hysonotus leucofrenatus*: MHNCI 6767, 15, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr. MHNCI 6529, 1, Cubatãozinho River, 21 Mar 1992, E. Grando Jr. *Kronichthys lacerta*: MHNCI 6533, 6, Cubatãozinho River, 21 Mar 1992, E. Grando Jr.; MHNCI 6766, 23, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr. *Microglanis cibela*: MHNCI 11512, 5, Rasgadinho River, Cubatãozinho River basin, May 1996, E. Grando Jr. *Pareiorhaphis azygolechis*: MHNCI 159, 1, do Meio River, Cubatãozinho River basin, Jan 1946, R. Hertel; MHNCI 5060, 1, rio Arraial, 26 Mar 1985, J. C. Ribeiro e A. Dambrós; MHNCI 6541, 3, Grande Stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr.; MHNCI 6764, 11, rio Cubatãozinho, 48°44' W and 25°41' S, 1 Oct 1992, A. Barreto and E. Grando Jr. *Pareiorhaphis splendens*: MHNCI 8965, 4, Castelhanos River, 1 Oct 1996, W. Wosiacki and V. Abilhoa. *Pareiorhaphis steindachneri*: MHNCI 4746 to 4758, 13, Arraial River, 26 Feb 1985, J. C. Ribeiro; MHNCI 6758, 6, Cubatãozinho River, 48°44' W and 25°42' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 8952, 12, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 8966, 3, Castelhanos River, 1 Oct 1996, W. Wosiacki and V. Abilhoa. *Pimelodella pappenheimi*: MHNCI 5256 and 5257, 2, Guaricana Reservoir, Arraial River, 27 Nov 1985, J. C. Ribeiro and A. Carneiro; MHNCI 5158, 9, Arraial River, 1 Oct 1985, J. C. Ribeiro and A. Carneiro; MHNCI 6771, 1, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6755, 1, Cubatãozinho River, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 10792, 10, Cubatão River, 12 Jul 2004, F. V. Silva. *Pseudotothyris obtusa*: MHNCI 6778, 13, Stream, Cubatãozinho River basin, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6776, 6, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6536, 8, Stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr. *Rineloricaria* sp. 1: MHNCI 6759, 23, Cubatãozinho River, 48°44' W and 25°42' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6761, 1, Cubatãozinho River, 48°44' W and 25°41' S, 1 Oct 1992, A. Barreto and E.

LISTS OF SPECIES

Grando Jr.; MHNCI 8958, 1, Arraial River, 02 Nov 1996, W. Wosiacki and V. Abilhoa; MHNCI 8959, 4, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa. *Rineloricaria* sp. 2: MHNCI 11350, 12, Cubatãozinho River, 48°44' W and 25°42' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6532, 2, Cubatãozinho River, 21 Mar 1992, E. Grando Jr.; MHNCI 6772, 2, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 7968, 1, Vossoroca Reservoir, 19 Sep 1989, R.G. Hickson and E. Vital; MHNCI 8076, 1, Vossoroca Reservoir, 20 Sep 1989, R.G. Hickson and E. Vital; MHNCI 8951, 54, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 8976, 7, Cubatão River, 02 Nov 1996, W. Wosiacki and V. Abilhoa. *Rhamdia quelen*: MHNCI 5090 and 5091, 2, Arraial River, 26 Mar 1985, J. C. Ribeiro and A. Dambrós; MHNCI 8962, 2, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 10794, 2, Cubatão River, 12 Jul 2004, F. V. Silva; MHNCI 10916, 10, Vossoroca Reservoir, 20 Nov 1991, IAP-SEMA. *Rhamdioglanis frenatus*: MHNCI 8981, 1, unnamed Stream, Castelhanos River basin, 3 Nov 1996, W. Wosiacki and V. Abilhoa. *Scleromystax barbatus*: MHNCI 6538, 1, unnamed Stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr.; MHNCI 6782, 2, unnamed Stream, Cubatãozinho River basin, 1 Oct 1992, A. Barreto and E. Grando Jr. *Schizolecis guntheri*: MHNCI 6521, 3, Chato Stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr.; MHNCI 11334, 3, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr. *Schizolecis* sp.: MHNCI 11335, 2, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr. *Trichomycterus* cf. *zonatus*: MHNCI 6519, 1, Chato Stream, Cubatãozinho River basin, 21 Mar 1992, E. Grando Jr.; MHNCI 11356, 1, Guaricana Reservoir, Jul 1998, W. Wosiacki.

PERCIFORMES: *Crenicichla tingui*: MHNCI 10791, Cubatão River, 12 Jul 2004, F. V. Silva. *Geophagus brasiliensis*: MHNCI 6786, 1, unnamed Stream, Cubatãozinho River basin, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 8964, 3, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 10798, 2, Cubatão River, 28 Mar 2004, F. V. Silva. *Tilapia rendalli*: MHNCI 5095, 1, Arraial River, Mar 1985, J. C. Ribeiro and A. Dambrós.

GYMNOTIFORMES: *Gymnotus carapo*: MHNCI 11958, 1, Cubatão River, 12 May 1996, E. Grando Jr.

CYPRINODONTIFORMES: *Jenynsia* sp.: MHNCI 11463, 3, Castelhanos River, M. Aranha, M. Menezes and A. Lorenzetto, 30 Apr 1999. *Phalloceros* sp.: MHNCI 6769, 8, Canavieiras River, 48°44' W and 25°43' S, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 6786, 4, Stream, Cubatãozinho River basin, 1 Oct 1992, A. Barreto and E. Grando Jr.; MHNCI 8963, 102, São João River, 48°48' W and 25°48' S, 31 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 8967, 47, Castelhanos River, 1 Oct 1996, W. Wosiacki and V. Abilhoa; MHNCI 8980, 12, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa; MHNCI 9804 and 9805, 66, do Porco River, Castelhanos River basin, V. Abilhoa.

SYNBRANCHIFORMES: *Synbranchus marmoratus*: MHNCI 11554, 1, Cubatão River, 2 Nov 1996, W. Wosiacki and V. Abilhoa.